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at all imitated among the Raniformia. These are the Discoglossidæ and Asterophrydidæ. In both the vertebræ are opisthocoelian instead of procoelian, and the sacral diapaphyses are dilated. The latter approaches closest to the ordinary type, having a simple coccyx with but one condyle, no ribs or fronto-parietal fontanelle, and a styloid xiphisternum. The genera are Megalophrys, Xenophrys, Asterophrys, Leptobrachium and Cryptotis, one Indian, one Australian, the rest Malaysian. The former family is the most remarkable. It has rudimentary ribs, a xiphisternum divided into two long haemapophyses, a coccyx with diapophyses and two condyles, and, in the recent types, a fronto-parietal fontanelle. The genera are Latonia, Discoglossus, Alytes, and Bombinator, all European. There are no arboreal types in these two families, and their terminal phalanges are straight, conic. They form the nearest living approach to the Batrachia Gradientia.

The Batrachian which have been called Proteroglossa form, I believe, a family—Rhinophrynidæ—among the Bufoniformes.

Description of a GAR-PIKE, supposed to be new—Lepidosteus (Cylindrosteus) oculatus.

BY PROFESSOR ALEXANDER WINCHELL.

In the month of February, 1863, the Museum of the University of Michigan received a specimen of an unknown gar-pike, from Duck Lake, Calhoun Co., Michigan. As Prof. Agassiz had made a special study of this genus, and had declared that he was acquainted with twenty-two species, I transmitted to him a brief description of the fish; but, for some reason, I received no reply. I sent the same to Prof. Baird, but obtained no assistance; I then wrote Mr. Putnam, at Cambridge, for references to all the published descriptions of *Lepidostei*, and, a few months ago, received the information sought; though most of it was already within my reach. On Prof. Agassiz' visit to Ann Arbor, last winter, during my absence this fish was shown to him by Dr. Sager. Prof. Agassiz thought it had been described by Dr. Kirtland, but he could not say in what work the description had appeared. The impression given was, that it had been published in some agricultural work, in Ohio, not generally accessible, and not likely to be seen by ichthyologists. I wrote to Dr. Kirtland on this point but received no reply. I am convinced that this species, if ever described, has not been made known through such a medium that the description can be said to be *published* to the scientific world. I am, therefore, determined to run the slight risk of creating another synonym, by offering the following name and detailed description.

LEPIDOSTEUS (CYLINDROSTEUS) OCULATUS. Winchell.

General form elongate-spindle-shaped, laterally flattened toward the tail, and vertically flattened from the nape forwards. Greatest height contained 10½ times in the whole length; greatest width the same. Lower outline nearly straight, slightly ascending at the throat, and more so from a point anterior to the anal to the base of the caudal fin; upper outline gently curved along the back, anteriorly somewhat more rapidly curved to a point over the angle of the mouth; lateral outline gently and equally curved from the extremity of the snout to the base of the tail; greatest vertical diameter through a point about three scales in front of the abdominal fins; greatest transverse diameter through a point about six scales in front of the abdominals.

Number of scales in a diagonal series (between the dorsal and ventral rows) 18, occasionally increased to 19, by the interpolation of an additional scale near the ventral row; number of scales in the dorsal row, between the head and the dorsal fin, 48; behind the dorsal fin, 8 or 9. The first diagonal series of scales do not meet on the nape of the neck, being separated by the pair of mutually equivalent scales of the dorsal row, which belong in the second diagonal series ; these two scales are pentangular. The scales of the dorsal row increase in width from the third to the sixth ; the third is small, triangular ; the fourth, rounded posteriorly and slightly curved on the four other sides ; the fifth becomes emarginate posteriorly, convex on the two contiguous sides, and overlapped antero-laterally by the adjoining scales of the next anterior diagonal series ; the sixth exhibits the same form with a greater transverse diameter ; the seventh is small again, and the width gradually increases to the tenth ; the eleventh in turn is small, and the size increases to the sixteenth, beyond which the size is rather variable. From the sixth to the twenty-second, the general form of the sixth is preserved, with a tendency to become less and less emarginate, and more elongate longitudinally. The lateral scales are rhomboidal, those which lie along the lateral line having the dimension which coincides with the direction of the diagonal series one and one-third times the other dimension. The longer sides are nearly straight ; the shorter, sigmoidally curved by lines which first bend downwards and then upwards. This form of the scales is shown to some extent by nine or more lateral rows on each side. Generally, the scales nearer the head are less angulated behind ; while those toward the other extremity are more drawn out. The surfaces of the scales, where not worn, are rough to the touch ; and under a magnifier, and even to the naked eye, are seen to be covered with fine granules. The first diagonal series is sculptured by vermicular, intersecting furrows, which show a tendency to radiate from the central area. Similar sculpturing can be traced on the sides, as far back as the sixth series.

Head one fourth the total length of the fish, lanceolate in outline, laterally tapering, with slight curvature from the hinder border of the opercula to the extremity of the truncately rounded snout. Eyes large, situated less than the diameter of the orbit behind the extremity of the lower jaw. Projection of the upper jaw beyond the lower, equal to the distance between the nostrils, which, opening upwards, in oval apertures, are situated half the same distance behind the tip of the snout. Lower jaw a little more than half the whole length of the head. Angle of the mouth midway between the tip of the snout and the hinder margin of the operculum. Each ramus of the jaw presenting below a flat surface, with parallel borders extending directly back for a short distance, and then slightly arching outwards ; on its lateral surface regularly increasing in vertical width to the small "angular piece ;" through half its whole length projecting laterally beyond the maxillary ; furnished with a principal row of strong conical teeth slightly bent backwards and inwards ; the lips furnished with a smaller set, and the internal surface clothed with a multitude of dentelets. The principal and labial teeth of the maxillary and intermaxillary are similar to those of the lower jaw ; the palatines are set with numerous fine teeth. The top of the head is somewhat flattened, becoming decidedly so on the snout. The suture bounding externally the frontal and parietal bones is a distinct, deep furrow, gently deflected outward at the base of the maxillary, behind which is a deep supra-orbital emargination of the frontal, which thence continues to widen regularly to its junction with the parietal. Opercular semicircular behind, nearly straight in front ; interopercular lanceolate, widening backwards, somewhat pointed in front, abruptly round-cuneate behind, with a triangular projection between the opercular and preopercular. Occiput regularly concave behind, except a backward swell in the middle. Whole surface of the head handsomely sculptured,the vertex rather deeply so ; on the snout and the sides and base of the head the embossed lines tend to become broken into granules.

Pectoral fins separated from the operculum by a single diagonal series of scales ; the ventral fins midway between the extremities, situated on the diagonal series which embraces the 17th scale in the dorsal row ; anal fin a little more than its width from the caudal, interrupting the 38th—42d diagonal series of scales ; dorsal fin of the same width as the anal, and situated so that the last three rays fall in the rear of it ; pectoral fins narrow, sharply rounded at the extremity, with the middle ray the longest; ventral fins relatively broader, rounded, with the second and third rays the longest, the last ray being the width of the fin shorter than the first; anal fin a little shorter than the ventral, but twice as broad, rounded, with the 3d and 4th rays the longest; caudal fin symmetrically and elliptically rounded at the extremity; the first (upper) ray reaching a little further back than the last; the first three rays considerably smaller than the last three, so that the sixth ray falls in the middle; skin terminating in a line stretching sigmoidally backwards from below to above, so that the base of the last ray is two-thirds the width of the tail anterior to the base of the first ray. A series of scales diminishing in size continues along the first and last rays of the caudal, and the first ray of all the other fins.

Ray formula: D. 8; C. 11; A. 8; V. 6; P. 9.

The ground color is pale yellowish-white, becoming deeper on the sides and back, and nearly white below. This is varied by a system of pale black maculation, which, along the back, conceals most of the ground color, and on the sides, about half of it, while the belly is almost spotless. On most parts of the body the maculæ are irregular, with a tendency on the sides to elongation beyond the length of one or two scales. On the top of the head and the operculum they become sharply defined circular spots, with intermediate blackish dots, while the throat is spotted in the style of the breast of a partridge. The fins are all maculate with oval, badly defined spots.

Measurements.—Total length 32·5 inches. Length of head from snout to occiput 6·8; to posterior margin of operculum 7·7; length of tail on the middle line 4; upper jaw to angle of mouth 4; width of snout one-fourth inch back from nostrils 0·62; width at angle of mouth 1·5; width of neck between posterior margins of opercula 2·2; greatest height of body 3; greatest width 3; height of head at occiput 2; at angle of mouth 0·8; length from tip of muzzle to insertion of pectoral 6·7; to insertion of ventral 9; to insertion of anal 17; diameter of orbit 0·57.

Comparisons.—In form, this species approximates most nearly to *Cylindrosteus latirostris*, Girard, from Texas. It differs specifically in having a larger orbit, the operculum and cheek less elongated behind it, the muzzle tapering a little more rapidly, and two or three fewer scales in an oblique series. The color, besides, is much less uniform, and the habitat remote. From *C. platostomus*, Rafinesque, it differs in having the caudal fin more nearly symmetrical; rays of ventral fin *not* cartilaginous; pectoral longer, narrower and straighter. The caudal has one more ray, and the anal and pectoral each one less. The snout widens less rapidly, and the scales are more rhombic. The coloration, especially the sharply defined circular spots, is strikingly peculiar. No spots, however, exist on the median line behind the anal fin. There are no other described species with which the present one requires to be compared, unless it be *C. albus* and *C. longirostris* of Rafinesque, and *L. gracilis*, Agassiz. The two former are very doubtful species, and the description of the latter is not at present accessible to me..

The following is now a list of the described species of Lepidosteidæ, arranged under three genera, discriminated according to information at hand. No attempt is made, at present, to exhibit the complicated synonymy, as the result would necessarily be too imperfect, from the want of adequate means of comparison.

Lepidosteus Huronensis, *Richardson.*
" gracilis, *Agassiz.*
" oxyurus, (*Rafinesque,*) *Kirtland.*
" spatula, *Lacépède.*
" osseus, *Lacépède.*
" leptorhynchus, *Girard.*
Cylindrosteus oculatus, *Winchell.*
? Cylindrosteus longirostris, *Rafinesque.*
? " albus, *Rafinesque.*
" platystomus, *Raf.*
" latirostris, *Girard.*
Atractosteus ferox, *Rafinesque.*
" Berlandieri, *Girard.*
" tristœchus, *Gill.*
" tropicus, *Gill.*